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ABSTRACT

The keynote article in this issue summarizes some of the lessons learned after a decade of using satellites for public service, and after five years of experimentation with information technologies designed for specialized audiences. Community service programs in the Appalachian Mountain and Rocky Mountain regions and in the state of Alaska are evaluated, and a series of observations are made suggesting reasons for the success or failure of these satellite projects. The report also includes an outline of projects funded by the telecommunications demonstration program and lists the name of the grantee, the technology used, the service rendered, and the end-user of that service. Other articles in this issue provide: (1) a discussion of satellite communications in rural Peru, (2) a glossary of the language of telecommunications, (3) some practical guidelines for radio scriptwriters and planners, (4) an examination of communications utilization in encouraging a hybrid cocoa farming program in Nigeria, and (5) a discussion of the use of interactive media by the Volunteers in Technical Assistance (VITA) program to send information on energy to requestors, primarily in developing countries. (MER)

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IMAGINATIVE USE OF NONBROADCAST TECHNOLOGY DIRECTS SOCIAL SERVICES TO ISOLATED AUDIENCES

by

Ann Erdman

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Imaginative Use of Nonbroadcast Technology Directs Social Services to Isolated Audiences

by Ann Erdman

The rush to apply experimental new technologies to the social problems of the 70's has left history enough and evidence enough for the public service community to learn valuable lessons. The following article draws on a decade of using satellites for public service, and on over five years of experimentation with other information technologies for specialized audiences.

Today, everyone is aware that satellite-delivered communications can span tremendous distances. The increased interest in telephone and in videoconferencing, the phenomenal growth in computer networks, and the increasing use of cable television to carry varied consumer communication services, all attest to the new technologies' ability to cut time and cost and offer greater information variety than ever before.

What is not yet well known is that these "nonbroadcast technologies" have increasingly become more accessible and less expensive as modes of information delivery. "Nonbroadcast" is generally considered to refer to transmissions intended for reception by a specific audience rather than for direct reception by the general public. Nonbroadcast transmissions often require decoders, antennae, or other devices to receive and convert signals for use by the specific user or subscriber. Thus, satellites, cable television, microwave, telephone, subcarrier radio and TV channels, and other telecommunications systems which deliver signals to specific audiences are considered nonbroadcast technologies.

During the decade of the 70's the availability of commercial satellites, new cable systems offering 80 or more channels, and high-capacity computer networks all held promise for offering the public a dazzling array of new communication systems for specialized needs at relatively reasonable costs.

Recognizing this potential, the former U.S. Department of Health, Education, and Welfare (HEW) began to examine ways technologies could be used for distribution of social services, which have been estimated to be as much as 75 percent information-transfer in nature. The prospect of reaching rural populations with satellite, and urban populations with cable, appeared especially promising. Of particular interest to service-providers was the possibility of using telecommunications to distribute continuing education services, public awareness and consumer assistance messages, and information and referral services for public assistance.

In the early 70's there was keen national interest in putting technology to work for public services. When the National Aeronautics and Space Administration (NASA) asked the Department of HEW to sponsor community service experiments aboard an Applications Technology Satellite, ATS-6, HEW saw in the invitation a unique opportunity. A demonstration devised to test the concept took place in 1974 in three distinct geographic areas—the Appalachian Mountain and Rocky Mountain regions, and the State of Alaska. The demonstrations resulted in experimental projects that provided in-service training for teachers in the Appalachian area, career education for junior high school students in the Rocky Mountains, and instructional programs for village schools in Alaska. Health experiments included two-way consultation-at-a-distance with physicians for patients in rural Alaska, and instruction for medical students in states without medical schools. A health project of the Veterans Administration facilitated exchange of medical information between remote hospitals and urban medical teaching centers.

Evaluation of this satellite demonstration provides interesting insights into the initiation of technology projects in general and of satellite projects in particular. Many of the lessons learned apply to the Third World as well as to the developed world. On the plus side, the demonstration may be considered to have been successful in four respects:

1) the technical aspects of the project worked well, demonstrating that satellite service was useful for reaching remote communities isolated from normal radio (in the generic sense—audio, video, etc.) reception by distance or geographic barrier;
2) projects initiated in Appalachia and Alaska became so essential to the social services programs that sufficient support was secured to lease commercial satellite time for the services. The transition from experimental to commercial satellite systems was relatively smooth;
3) the Public Service Satellite Consortium (PSSC), an organization designed to identify potential social service users of satellite communications and to facilitate their access to transponder (satellite usage) time, was established, and has

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succeeded in developing a substantial user community;

4) the Corporation for Public Broadcasting was convinced by the experiments to move ahead with a satellite network for interconnection of all public broadcasting stations. The satellite network is now operating an effective system.

On the other hand, the failure of the Rocky Mountain project to sustain interest in and support for continued operation was a disappointment to demonstration planners. This failure is generally attributed to the project's inability to establish an institutional base of support. The prime contractor, a federation of states, proved unequal to the task and was subsequently dissolved, leaving no permanent institution with responsibility, interest, or resources to maintain the services.

In addition, poor maintenance of equipment and lack of technical assistance to teachers/facilitators resulted in disappointment with the services provided, and failure to sustain demand. These problems were a result of a combination of factors—defective TV sets, difficulties of servicing remote sites, and other management concerns common to communications projects, many of which can be forestalled to a large extent by effective early planning. Unfortunately for this project, adequate lead time for planning was not available.

Three observations which may help planners avoid similar implementation problems can be made about this project:

Observation #1: Projects intended for long-term operation must insure that local communities consider the proposed service necessary, that they accept the technology, and are prepared to deal with implementation problems.

Observation #2: Reliable equipment and effective maintenance policies are essential to efficient project performance.

Observation #3: Adequate training and support are critical to the effectiveness of on-site facilitators and acceptance of the service by end-users.

Interest in nonbroadcast communications generated by the ATS-6 experiments resulted in an HEW request for amendment of legislation (the *Communications Act of 1934*) to allow the Department to provide grants or contracts for the application of nonbroadcast technology to the delivery of HEW services. Congress enacted such legislation in 1976, establishing a Telecommunications Demonstration Program that subsequently awarded grants totalling $3 million to 15 projects, which ranged from a computer/telephone system for the deaf in Boston to a microwave system for migrant farm worker services in California. While the discussion here addresses only problems encountered in implementing the demonstrations, it is important to note that the projects eventually achieved a success rate of 75 to 80 percent in reaching their collective system and service goals.

Several problems common to these projects were associated with equipment, institutionalization, and utilization. We will look briefly at these problems to make a few further observations.

The Demonstration Program required that each project propose an *innovative* use of nonbroadcast telecommunications for the delivery of health, education, or other social services. Projects were also required to assess the needs of the target population, assure that the proposed project addressed those needs, and provide assurance of local support for the project after government funding ended.

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Projects Sponsored by the Telecommunications Demonstration Program, U.S. Department of Education

Grantee	Technology	Service	End-User
State of Alabama	Radio/telephone	Emergency medical	Rural medical patients
Deaf Community Ctr. Boston, Mass.	Computer/telephone	Electronic mail	Deaf persons
Center for Excellence (CenTeX) Williamsburg, Va.	Microwave/telephone/ cable/subcarrier radio	Specialized news, reading, consumer info.	Hearing- and visually-impaired, elderly, homebound students
Nat. Farm Worker Serv. Ctr., Cal.	Microwave/telephone	Social service network	Migrant workers
Medical Care Dev. Augusta, Me.	Slow-scan TV/telephone	Continuing education	Health professionals
PACE-Cook Co. Dept. of Corrections, Chicago, Ill.	Slow-scan TV/telephone	Employment, family visitation, training/education	Jail inmates
KSPS-TV, School Dist. #81, Spokane, Washington	Cable/microwave	Distribution of educational programming	Students
Univ. of Southern Maine, Portland	Computer/telephone	Human service teleconferencing network	Social service agencies
Univ. of Cincinnati, Ohio	Slow-scan TV/telephone	Library/physician consultation service	Health professionals
Pennsylvania State University	Cable/microwave	Continuing education	Students/general public
New York Univ.	Teletext (broadcast subcarrier)	Consumer information	General public
Wernersville State Hospital, Pa.	Microwave/cable TV	Interactive community service TV	Mental patients
Univ. of Wisconsin	Dial-access telephone	Health, consumer info.	General public
Univ. of Denver	Slow-scan TV/telephone/ facsimile	Library services	Rural communities, general public
Tri-State Red Cross Blood Center, Huntington, W. Va.	Computer/telephone	Blood inventory management	Hospitals

Rural Communications Project in Peru Uses Satellite to Serve Remote Jungle Areas

by Richard Martin

Isolation and lack of communication are obstacles to development of potentially productive areas in many countries. A good example is Peru, where that country's government has recently been directing new development resources to areas of its interior that have previously been virtually inaccessible. An ambitious program is under way to encourage the development of commerce, agricultural production, and essential public services in the country's rich northeastern jungle region. As a result of these efforts, the region has begun to attract settlers from less productive parts of the country, and it is hoped that eventually the area will produce large quantities of food products needed in the rest of the country.

To support this effort, the Peruvian National Telecommunications Company (ENTEL-Peru) and the U.S. Agency for International Development (AID) are developing an experimental, low-cost rural telecommunication project in the eastern jungle department of San Martin. In the past, this department's remoteness has been a major obstacle to development. Commercial agriculture on a regional scale has been slow to develop, and public services such as education and health care function sporadically, with little effective supervision or support.

Telephone service came to the region's largest city, Tarapoto, in 1979 with the installation of a communication satellite earth station. Operating through a quarter of a satellite transponder leased by ENTEL from INTELSAT, this new station provides the first reliable telephone service between Tarapoto and the capital city of Lima. Utilization of the new service has been high and continues to increase rapidly.

ENTEL is providing similar "DOMSAT" services to six other remote cities throughout the country. All of the ground stations used so far have been large INTELSAT-B type stations, costing $800,000 or more each.

The stations are proving to be an economical solution to the problem of providing telecommunication services to those remote population centers that generate a large volume of telephone traffic. However, because of their high cost, they can do little to alleviate the isolation of the many small communities where most of the people of the region live.

The ENTEL-AID project is an effort to extend communication services beyond the region's cities to the rural farming communities in the region. The project will link seven communities in a field test of the cost-effectiveness of rural communication services. The experimental communication network, designed to minimize costs, will consist of a combination of three small, thin-route communications satellite earth stations, each costing less than a fourth of what the larger INTELSAT-B earth stations cost. Completing the system will be village radio telephones and land telephone lines. System design, installation, operation, and maintenance are the responsibility of ENTEL-Peru. AID is providing electronic equipment, user training, and evaluation studies.

The project has a number of unusual features, the most important of which is its public service focus. Although the project is being implemented by a telephone company, preferential access to the system will be given to government development program staff working in remote health posts, rural schools, and agricultural extension offices. In most villages, a separate telephone line will be provided for the exclusive use of development workers, and special low tariffs will be developed for these users. ENTEL-Peru has established a separate office in its headquarters to manage the project, with a staff that includes sociologists and economists. It is expected that this office will become a permanent Office of Development Communication, encouraging the company to design services appropriate to the needs of rural communities and public service users.

Wide Variety of Services

Another unusual feature of the project is the variety of communication modes that will be available to users. In addition to traditional person-to-person or station-to-station service, the system will permit conference calling among three or more sites. In some sites, speakerphones will be used so that groups can participate in these "decentralized" meetings. The system will also be able to relay instructional radio programming to local radio stations in the project area for rebroadcast to the general public.

Before the communication network begins to operate in early 1982, planners will interview public service users and develop a utilization plan combining various specific applications. The communication network will make it possible for Peruvian development ministries to provide reliable support services to staff members working in the field.

Project-sponsored activities using the experimental communication network will include such areas as inservice training for rural primary school teachers, medical advice for village health paraprofessionals, and coordination of travel and distribution of supplies for agricultural extension agents.

The project is a test of new kinds of communication equipment and, more importantly, of new institutional arrangements for providing communication services to remote rural areas. It will be carefully evaluated in terms of costs, revenues generated, utilization of the system, and impact on the delivery of social services and on the pace of economic activity in participating communities.

The Peruvian rural communication services project will have an impact far beyond the seven participating villages. Neighboring Andean countries are being invited to observe the project and participate in the project evaluation. Evaluation data and other project information will be provided to telecommunication planners, development ministries, and international funding agencies. The experiment, if successful, will provide experience, models, and cost-effectiveness data that will help other countries analyze their own rural telecommunication needs and plan services that are reliable, economical, and responsive to development needs. ■

(This article was adapted with permission from the June 1981 issue of Uplink, *the newsletter of the AID Rural Satellite Program.)*

Richard Martin is an education specialist in the AID Bureau for Latin America and the Caribbean.

Learning About Water: Kit and Action Guide

This year marks the start of the United Nations' International Drinking Water Supply and Sanitation Decade. During the Decade many groups will join forces to help provide "clean water and adequate sanitation for all by the year 1990," the lack of which gravely affects human health and productivity and severely impedes development progress.

A kit has been produced to provide all those who will be involved in the Decade with basic information and action ideas. It contains a "Decade Dossier" outlining dimensions of the need and Decade strategies for action; four case histories on water/sanitation activities; a "Decade Action Guide" with suggestions and examples of specific activities for various Decade participants, a wall sheet and a set of photo sheets illustrating key Decade themes; and a listing of other information materials available.

The kit is available from UNDP Information Section, Palais des Nations, CH-1211 Geneva 10, Switzerland, or from UNDP, 1 United Nations Plaza, New York, NY 10017, USA.

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Glossary: The Language of Telecommunications

The language of telecommunications is changing as fast as the technologies of telecommunications. In this glossary, we have attempted to define some of the most commonly used terms in the specialized world of computers and telecommunications.

Because the language is constantly evolving, there may be those readers who disagree with certain definitions given here. To those who disagree with a definition, we want to make it clear that we do not claim perfection—we do not even anticipate having the last word. Write to us! Let us know what you think, and we will publish glossary updates at intervals.

Note: the terms marked with an asterisk (*) are words which are commonly used in several ways. The definitions given here are limited to their use as they apply to the new technologies.

AM: Amplitude modulation. (See Modulation.)

Analog: Representations which bear some physical relationship to the original quantity: usually electrical voltage, frequency, resistance or mechanical translation, or rotation. Contrast to digital.

Artificial Intelligence: Computer systems which perform functions normally associated with human reasoning and learning.

Audio Teleconference: See Teleconference.

Bandwidth: The maximum frequency (spectrum) measured in Hertz or cycles per second, between the two limiting frequencies of a channel.

Baud: Bits per second (bps) in a binary (two-state) telecommunications transmission.

Binary: The basis for calculations in computers: a numbering system having only two numbers, typically 0 and 1; a base system.

Bit: One binary digit. The smallest part of information with equally likely values or states, "0" or "1," or "yes" or "no." In electrical communication systems, a bit can be represented by the presence or absence of a pulse.

Broadband Communication: Communications using high frequency signals (e.g., 6 MgH, the bandwidth of a TV channel). Video teleconferencing is a broadband medium.

Byte: The group of bits, processed or operating together, needed for one character.

Cable Television: The use of a broadband cable (coaxial cable or optical fiber) to deliver video signals directly to television sets. Current systems may have the capability of transmitting signals in two directions.

CATV: Cable television or community antenna television.

Carrier: (*)Electromagnetic signal with a constant amplitude and frequency.

Central Office: (*)The local switch for a telephone system; sometimes referred to as a Class 5 Office, or a wire center.

Channel: (*)In communication, a single path or section of the electromagnetic spectrum which is uniquely assigned for a particular use.

Chip: (*)A thin silicon wafer on which electronic components are deposited in the form of integrated circuits.

Coaxial Cable: A metal cable consisting of a conductor surrounded by another conductor in the form of a tube which can carry broadband signals by guiding high-frequency electromagnetic radiation.

Communications Satellite: Satellite used to transmit voice, data, and program signals.

CPU: Central Processing Unit. The component in a stored program digital computer which performs arithmetic, logic, and control functions.

CRT: Cathode Ray Tube. A video display vacuum tube used in television sets and computer display terminals.

Data: (*)The raw information within a computer system.

Digital: A function which operates in discrete steps as contrasted to a continuous or analog function. Digital computers manipulate numbers encoded into binary (on-off) forms, while analog computers use continuously varying forms. Digital communication is the transmission of information using discontinuous, discrete electrical or electromagnetic signals which change in frequency, polarity, or amplitude.

Direct Broadcast Satellite (DBS): A satellite system designed with sufficient power so that inexpensive earth stations can be used for direct residential reception.

Dish: (*)A parabolic antenna that is the primary element of an earth terminal.

Downlink: The transmission from a satellite to an earth station.

Duplex: (*)A transmission in which signals can go in both directions simultaneously.

Earth Terminal (or Earth Station): Equipment on the ground used to send and/or receive satellite communications.

Electromagnetic Radiation: A form of energy including radio and light which propagates through space in the form of oscillating electric and magnetic fields or "waves."

End Loop: A communications circuit which extends from the customer to the local switching center.

End-User: Ultimate consumer of a service.

Facsimile Transmission: The electronic transmission of pictures, charts, graphs, etc. from one place to another by radio, telegraphy, or telephone.

Fiber Optics: Communications technique based on a laser transmission that uses a fiber, or thread-like material, which carries light the way copper wires carry electricity.

Floppy Disc: A small, flexible disc carrying a magnetic medium in which digital data are stored for later retrieval and use.

Footprint: (*)That part of the earth's surface where a particular satellite's signal can be picked up. A footprint can cover one third of the globe, but will usually be less.

FM: Frequency modulation. (See Modulation.)

Frequency: The number of recurrences of a phenomenon during a specified period of time. The measurement unit of electrical frequency is the Hertz.

Geo-Synchronous Communication Satellites: Orbital space vehicles which appear to be stationary over one point above the equator, permitting the use of less-expensive earth stations without tracking equipment.

Gigahertz: (GHz) Billion Hertz (cycles per second).

Ground Station: See Earth Terminal.

Hardware: (*)The electrical and mechanical "body" or equipment used in telecommunications or computer systems.

Headend: Cable system site that houses the specially designed equipment needed to receive, process, and originate signals for a cable system.

Hertz: (Hz) The unit of frequency. One Hertz is equal to one cycle per second. Named in honor of Heinrich Hertz, first to detect such waves in 1883.

Input: The data that is entered into the computer; the act of entering data.

Interactive Media: A two-way telecommunications system that permits viewer response or participation. Interactive allows direct exchanges among people via one or more communication channels.

Interface: The place at which two systems (such as a computer and its supplementary equipment) meet and interact with each other; the means by which the interaction is made (e.g., an "interface card.")

International Telecommunication Union (ITU): An international organization affiliated with the U.N. which allocates radio frequencies through mutual agreement and coordinates telecommunications interconnections. Founded in 1865, it is the world's oldest such cooperative organization.

Kilohertz: (KHz) Thousand Hertz.

Logged In: (*) Connected to a computer.

Magnetic Disc: A form of computer memory in which data are stored in a magnetic oxide that coats a plastic or metal disc. The data are recorded and played back (read) by magnetic heads which traverse the rotating disc under programmed control.

Megahertz: (MHz) Million Hertz.

Memory: (*)The computer's information storage capability, also called "storage."

Microchip: An electronic circuit with multiple solid-state devices engraved through photolithographic or microbeam processes on one substrate.

Microcomputer: A set of microchips which can perform all of the functions of a digital stored program computer. (See Microprocessor.)

Microprocessor: A microchip which performs the logic functions of a digital computer.

Microwave: High-frequency radio waves used for point-to-point transmission.

Modem: A device which is used for interfacing (or matching) different functions of a communications system.

Modulation: (*)The process of modifying the carrier to impress on it the characteristics of another signal by changing its amplitude (AM), its frequency (FM), or its phase (PM), or by turning it on and off in a predetermined pattern (pulse code modulation).

Multiplex: The ability to transmit several signals from different sources to different destinations over a single channel at once.

Narrowband Communication: A communication system capable of carrying only a few voice channels or relatively slow-speed computer signals.

Nonbroadcast: Transmission directed to a specific audience. Also called **narrowcast,** it can include cable TV, satellite, teletext, etc.

Off-Line: Method of operation in which a device is not directly connected to a telecommunications system or operating computer.

On-Line: A method of operation in which a device is directly connected to a telecommunications system or an operating computer.

Operating System: A set of instructions for a computer which permits it to run various programs and handle scheduling, control of printers, terminals, memory devices, etc.

Optical Fiber: A thin, flexible glass fiber the size of a human hair which will transmit light waves capable of carrying vast amounts of information.

Output: The information generated by a computer.

Packet Switching: A technique of switching digital signals with computers whereby the signal stream is broken into small packets and reassembled in correct sequence at its destination. There are many variations used in data networks, in satellite communication, and for secure voice communications.

PBX: Private Branch Exchange; a telephone switching office.

Simplex: Transmission in only one direction at a time.

Slow-Scan Television: A technique of placing video signals on a narrowband circuit, such as a telephone line, which results in a picture changing every few seconds. Useful for transmitting still pictures.

Software: The instructions which direct a computer program. Any written materials or script, including films, videotapes, etc., for use in a communications system, or the program produced from the script. (See Hardware.)

Telecommunications: The use of wire, radio, optical, or other electromagnetic signals to transmit or receive signals, sounds, or images.

Teleconference: A meeting where participants in different locations are linked by a telecommunications system. Can be *audio* teleconference (voice only) or *video* teleconference (where participants see one another via TV). Satellites represent a successful communications medium for teleconferencing.

Teletext: Broadcasting service using several otherwise unused scanning lines between frames of TV pictures to transmit information which is displayed on the screen.

Transponder: The equipment on a satellite that accepts the signal sent from earth and after amplifying and changing the frequency, sends it back to earth for reception.

TV: Television.

Uplink: The transmission from an earth station to a satellite.

Videotex: Service similar to teletext except that information is delivered by telephone and can be used in the interactive mode. ■

This glossary was compiled with the help of a variety of people and sources. The primary print source, from which several definitions are reprinted with permission, is a program booklet prepared for a symposium "Communications in the Twenty-First Century," sponsored by The Colgate Darden Graduate School of Business Administration, the University of Virginia, in cooperation with The Annenberg School of Communications, University of Pennsylvania and the Annenberg School of Communications, University of Southern California. The Symposium, funded by Philip Morris Incorporated, was held in April, 1981, in Richmond, Virginia.

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Other requirements included standard provisions for responsible administration, staffing, fiscal management, and a self-evaluation of project results. The innovation requirement led three projects to propose the design and development of hybrid equipment. In all three cases, technical problems caused serious delays in project implementation, leading to the following observations:

Observation #4: Projects that plan to use highly specialized equipment must be prepared for implementation periods that are about 50 percent longer than projects which use readily available equipment. They must also allocate above-average budgets for staff education and equipment maintenance.

Again, as with the Rocky Mountain satellite demonstration, several projects which failed to secure other funding collapsed when government assistance ended. Generally, their problems were staff problems, a very difficult area to assess prior to project implementation. Retirement, resignation, and poor management ability prevented three projects from becoming operational.

A fourth project was foreshortened by unanticipated problems in obtaining regulatory approval of its system design. It thus lost second-year funding that would have substantially altered its prospects of becoming self-supporting.

Observation #5: Project staff must be carefully selected with respect to their dedication to project success, their management experience, and their ability to make substantial commitments of time (about three years) to a project.

Observation #6: Projects dependent on government or other outside support should have short- as well as long-term goals, so as to be able to show a record of incremental gains if funding is foreclosed prematurely.

Observation #7: Appropriate regulatory clearance for proposed use of radio spectrum *must be obtained prior to initiation* of any telecommunications project.

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In order to succeed, nonbroadcast technologies must promote user acceptance and reliance on communications services and, as a result, develop audiences willing to support continued operation. One of the most difficult problems of communications projects is that of striking an equitable balance between development of the technical system and development of its public service components. Systems must function smoothly and users must receive needed information in a timely manner to make the system viable. Both are equally important to the attainment of project goals.

Observation #8: Projects must allocate substantial resources to assure that systems attain their service goals and develop user acceptance and support.

Finally, it is interesting to observe that the nonbroadcast technology most heavily utilized in the demonstration projects was telephonic communication—one of the oldest, most reliable, and most accessible telecommunications systems in the U.S. Most projects used some form of telephonic communication to support their service or to act as its primary carrier. While we are seeing rapid development of satellite and cable systems, telephonic and broadcast services are still the most widely accessible communications media, and systems that piggyback on these signals or otherwise make use of their ubiquity probably have the greatest chance for long-term service and immediate success. This in no way diminishes the importance of cable, satellite, and other developing systems; it only suggests that availability and familiarity are perhaps of greater importance to the social services which seldom have the capital to support high-risk ventures. Thus, we conclude:

Observation #9: Organizations considering the application of nonbroadcast technology to the delivery of public or social service programs should look first at the most accessible, familiar, multipurpose communications systems available in their immediate area, and then, if necessary, enhance these systems to meet the needs of the target audience with the most reliable and appropriate of the new technologies. ■

Anyone desiring further information on projects sponsored by the Telecommunications Demonstration Program should note that the program is now administered by the U.S. Department of Education. Information may be obtained by writing to:

Telecommunications Program
U.S. Department of Education
Washington, D.C. 20202 USA.

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Radio Instructional Programs: Some Practical Guidelines for Scriptwriters and Planners

by Esta de Fossard

In today's world of universal and constant communication, radio is still one of the most effective ways of sending out information to a great many people over wide distances. In the United States, we are inclined to think of radio as useful for music and commercials and for very little else, but in many other countries of the world, particularly Third World countries, radio remains an important medium of education. To use radio effectively for education requires an understanding of the strengths and weaknesses of the medium, and an understanding of the methods of structuring and scripting radio instructional programs.

Most people assume that anyone who knows a subject well can automatically write a radio script for it. But good writing does not come automatically in any medium, perhaps least of all in radio, where the subtleties of the medium must be understood as well as, if not better than, the subject matter itself.

Instructional radio must always reflect its *raison d'être:* to instruct. A radio scriptwriter should therefore constantly remember the script's *purpose,* its *measurable instructional objectives,* and its *audience.*

The entertainment value of an educational script should be subliminal, almost accidental. Good education can be intriguing without being "entertaining" (in the contemporary sense of the word). Because a good educational radio script should convey the same enthusiasm, integrity, and fascination as a good classroom lesson, it is essential that the radio scriptwriter truly appreciate the subject being taught.

The Nature of Radio

Radio is the medium of visual imagination. It presents no actual pictures of its own, but invites its listeners to provide their own "pictures" in much the same way as reading does. The luxury of imagining pictures has been largely lost in our television-saturated age, as has our ability to listen attentively. The writer of a good radio script, therefore, must choose his or her words as carefully as a poet to attract the listeners' attention and encourage them to "put themselves in the picture."

Because it leaves so much to the listener's imagination, radio is a highly personal medium. The listener enters into a one-to-one relationship with the radio voices, as if indulging in conversation with them. A good radio script takes advantage of this intimacy to encourage listeners to feel a sense of personal involvement.

Constraints in Writing for Radio

Because radio relies on only *one* of the listener's senses to receive *all* of the information, complex ideas must be broken down into small concepts and reiterated in a variety of ways. It is useful to keep in mind that:

- characters must be clearly recognizable by their voices rather than by their physical appearances;
- names of characters must be used more frequently than they would be in normal life, or in visual presentations;
- emphasis and emotion must be carried by the voices or enhanced by accompanying "mood music."

While characters can be portrayed very effectively through voice, the setting presents another problem. In a visual presentation, the audience knows immediately when the action has moved from one place or scene to another. In radio, a scene change has to be indicated by a musical bridge, by ambient sound effects, or by an indication (preferably subtle) from one of the characters that the audience is now required to imagine itself in another place.

The Need for Restraint

At the same time, however, a radio program must avoid "medium overkill." There is a tendency, particularly in inexperienced producers and writers, to over-use sound effects and music. Too much sound can be as distracting to an audience as too little. Sound effects and music in radio production should be as appropriate and as subtle as visual imagery in a good film or television production.

In the same vein, it is particularly important for instructional radio to avoid using too many words. Indeed, almost ironically, words need to be used more sparingly than they might be in visual presentations, or than they would be in a classroom lesson. It is all too easy for listeners to become swamped by a sea of words and miss the message in the words. The skill of any educational scripting, be it for radio, television, or textbook, lies in making the instructional message clear, but not so blatant as to be boring.

The Needs of the Audience

An understanding of the audience is essential. The writer needs to know the age, the experience (both with radio and with the sub-

(continued on next page)

ject being taught), and the ethnic and cultural backgrounds of the audience. He or she must also know the educational methods to which the audience is accustomed.

It is advisable for the scriptwriter(s) to sit in the classrooms for a number of sessions before beginning to formulate any ideas of how the finished script might be put together. Good educational scriptwriters are like good architects—they might have all sorts of ideas for designing beautiful buildings, but they must keep in mind the function of the building they have been asked to design, and be willing to tailor their ideas to the needs of that function.

Some Practical Guidelines

- Restrict the number of characters used—two or three at one time is enough. Too many characters confuse the audience, and it is very hard to establish any real identity for each character in, say, a half-hour format.
- Restrict "hard core instruction" to the main characters. If you wish to use peripheral characters in story lines or for songs and games, let these be supplemental to the main teaching message. Students are accustomed to accepting the main instructional message from an identified "teacher." This does NOT mean that the character(s) giving the instructional message have to appear in the program as teacher(s).
- Use "signature music" to announce the entrance of characters and to introduce various segments. Radio listeners count on musical cues to set the scene for what is to follow.
- Present the lessons in a recognizable, but alterable, format. An instructional radio series should see itself as an oral textbook. A good textbook uses a well-designed format, so that students using it soon learn that, for example, each lesson begins with a vocabulary lesson; followed by a story; followed by a practice exercise; followed by a summary. Similarly, the radio lessons should be structured around a clear format. Within that format there is room for considerable variation, and there is no harm in occasional divergence from the format, but it is unfair to expect a student (of any age) to glean the lesson from an irregular mix of ideas.
- Balance the format, making sure to combine strong teaching sections with "relaxation" sections of games, music, reinforcement, etc. For certain types of programs, it is highly effective to create what I call a "donut/donut hole" format, where the "donuts" are the tight instructional pieces and the "holes" (equally edible) are the relaxation or reinforcement times. The holes can be lifted and used time and again in many programs, as children love to hear their favorite songs or games or stories over and over again. (Donuts are small, round, sweet breads with a hole in the middle of them.) This type of format also makes it easy to make changes in a program that has been found wanting—it means perhaps the replacement of a number of donuts or donut holes without having to restructure and re-record the whole program.
- Keep sound effects subtle and appropriate. Don't be tempted to throw in a muted trombone every time a character yawns.
- Finally, if you want your radio instructional script to be a success, make sure it goes from your scriptwriter into the hands of a producer who knows how to use the medium of radio, and to actors who are trained in radio delivery!

Since the advent of television, there has been a tendency for us to forget the sense of hearing—except for soaking up background music—and concentrate almost exclusively on sight for receiving information. The ears, however, give as direct access to the brain as do the eyes, and radio should never be considered a little brother of television, or a lesser medium of instruction. Correctly understood and effectively used, radio can be the gateway to extended knowledge for millions of people throughout the world. ■

Esta de Fossard is Director of Adult Education at WCET Channel 48 in Cincinnati, Ohio. Her background is in radio instructional writing, a field in which she has been active both nationally and internationally.

Landless Villager Puts Video to Dramatic Use

Is video useful in communication for development? It depends on how it's used. Anil Srivastava of the Centre for the Development of Instructional Technology (CENDIT), New Delhi, India, tells how he and his colleagues took a chance which helped villagers to communicate honestly. He writes:

Video fascinates me. I know it to be an appropriate technology for communication for development. It is a more manageable and accessible technology. With little training people can learn to handle the equipment, and as they can see for themselves what they are recording on tape, they tend to learn fast from the experience. People tend to participate in making videotapes. And with every passing month the equipment and the consumable material are becoming cheaper.

I would like to mention our Saharanpur Community Video Equipment. We did not think that we had the answers and we did not have an ideology which seems to fit the situation. We felt that perhaps video was a channel, a platform for a dialogue with the community or within the community. They will have to decide what to do, we are just going to be the extension of the hardware. The problem is that this kind of work takes a long time to yield any results. A person involved in the problems of his community can instinctively present it much better. He gets to the heart of the matter while the 'outsiders' fumble around.

This was apparent to us the very first day we brought the portapak to the village we were working in. After recording the pretty images of rural countryside and poverty, we ran out of ideas. There came an old man, a Muslim and a grandfather with his granddaughter in his arms. He was a landless laborer in his fifties. He peered into the viewfinder, pointed the camera at the tree and the children and then when we played back what he had just recorded he was amused. He was a little more daring. He asked us whether he could take it and use it. I do not know what got into us but one of the group said 'go ahead.'

He vanished for more than an hour and we thought that was the last we would see of the portapak that we had borrowed in the first place. But he came back as he had run out of the tape and wanted it played back. What this landless laborer had done was that he went around accosting better-off farmers and asked them what they thought of the problems of poor landless laborers like him, what they are doing about it, and so on. It was a revelation for, as if peeling an onion, layer by layer, he brought out the core of hypocrisy. They all wanted to help their brothers but what can they do, there is not enough kerosene and the diesel and fertilizer and so it was obvious from the 'interviews' that no one is going to do anything for the poor, it is they who must help themselves. I could not have made that program nor could my colleagues because we would have been too impatient. We would have superimposed our views.

(The Centre for Development of Instructional Technology is a non-profit society, founded in 1972, which believes that communication accelerates social change. CENDIT works mainly in villages enabling people to use media for their own development.) ■

CENDIT, C11 Community Centre, Safdarjung Development Area, New Delhi 110016, India.

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A Communicator's Checklist

1 ***Educational Evaluation Methodology: The State of the Art,*** edited by Ronald A. Berk (Baltimore: The Johns Hopkins University Press, 1981), 168 pp. US $15.00 hardcover.

Many present-day books about evaluation are deeply rooted in the U.S. experience. This is rarely acknowledged explicitly but is immediately obvious to the reader who tries to interpret results or advice from the perspective of another part of the world. The U.S. framework is especially pervasive in books about educational evaluation, almost all of which assume a federally organized system and a huge enterprise involving millions of dollars annually.

Education Evaluation Methodology: The State of the Art, edited by Ronald A. Berk, is a collection of articles that were presented at a 1979 symposium at Johns Hopkins University. The authors are recognized authorities in the field and their presentations are all of excellent quality. However, the articles vary quite considerably in usefulness to practicing evaluators outside the U.S. context.

The editor defines evaluation as "the process of applying scientific procedures to collect reliable and valid information to make decisions about an educational program." He notes that the definition "reflects the traditional *quantitative paradigm* of evaluation as opposed to the *qualitative paradigm*" and, indeed, the contributions focus on quantitative methods for assessing program effects.

Individual authors have interpreted their task differently. Some have assessed broadly the state of their assigned area, while others have explored in depth a problem that seems particularly salient. Some have tried both.

Anthony Bryk and Richard Light contribute a chapter on "Designing Evaluation for Different Program Environments" that *very* briefly surveys some key design issues. They distinguish three types of program environment—regular school district, discretionary, and demonstration programs—and then limit their discussion to demonstration (pilot) programs. I found both the general discussion and their examination of an issue of particular interest to them—assessing impact when services are highly individualized—too brief to be of much use. However, I thoroughly endorse one of their general conclusions:

> The task of evaluation design has become a complex effort imposing much more than just technical decisions about fitting appropriate methods to evaluation questions. We are now talking about a process involving important political and social dimensions, as well as technical and fiscal resource considerations (p. 29).

The chapter on "Measuring Program Effects" by Nancy Cole and Anthony Nitko suffers from the kind of schizophrenia noted above. Some sections provide an excellent general discussion of crucial issues that must be addressed in choosing tests to measure educational outcomes. Other sections provide an interesting but often jargon-laden examination of particular aspects of test bias. Those for whom the more general material is particularly useful and relevant are likely to find the discussion of test bias heavy going.

In Chapter 3, William Cooley, Lloyd Bonds, and Bor-jiin Mao confront a technical issue—"Analyzing Multi-Level Data." The chapter addresses the problem of the level at which data should be aggregated (student, classroom, school, district) using a causal modeling framework. It is well written and will be illuminating to those who worry about such problems.

Robert Linn presents a useful discussion of another technical issue—"Measuring Pretest-Posttest Performance Change." This is an extremely important area because pitfalls attend *all* the commonly used methods for measuring growth in achievement and, despite considerable discussion of these problems in the literature, the methods are used unthinkingly in many evaluations.

Wolf's chapter on "Selecting Appropriate Statistical Methods" is, in my view, the least satisfactory in the book. He seems to view the process as (a) taking place *entirely* after the data have been collected and (b) consisting largely of trying to decide whether to use analysis of variance, analysis of covariance or regression analysis. I have no quarrel with many of his major points: the analyst should become thoroughly familiar with the data set by looking at descriptive statistics and scatter plots, each dependent variable should be analyzed separately, and so on. But the entirely *ad hoc* character of the discussion disturbed me.

Lois-Ellin Datta talks knowledgeably and comprehensively about using evaluation results, very much in the U.S. context. Finally, Daniel Stufflebeam tells us about the "Standards for Evaluation of Educational Programs, Projects and Materials."

So, who is this book written for and who is likely to find it useful? The editor (who, by the way, provides helpful introductions to each chapter) hopes that the book will serve as "a handbook for practicing evaluation methodology issues and problem areas." Well . . . a tall order. There is much of interest to any of these groups of readers but not too much for any one group. I suggest you ask your library to buy the book. And how about readers from other parts of the world? I particularly recommend the chapters on test design (Chapter 2) and measuring performance change (Chapter 4). Most of the other material will take some careful thinking to make it applicable situations around the globe. ■

Reviewed by Barbara Searle, an educational evaluator in the Department of Education of the World Bank.

2 ***Electronic Colonialism: The Future of International Broadcasting and Communication,*** by Thomas L. McPhail (Sage Library of Social Research, Vol. 126. Beverly Hills, CA: Sage Publications, 1981), 288 pp. Price: hardcover, US $20; softcover, US $9.95.

Thomas McPhail is professor of Mass Communication and Journalism at Carleton University in Ottawa, Canada. The book is the product of his work at UNESCO during the years 1978-80, and the book is at its best when the author describes the Belgrade and Paris UNESCO General Assemblies he attended. Some of the internal machinations and politicking about people's careers make interesting reading. McPhail devotes the first part of the book to a description of what is meant by the "new world information order" and "development journalism." These are sections that may benefit a novitiate to the debate.

But the book bogs down immediately in a resurrection of the *Four Theories of the Press* debate formulated by an American, Wilbur Schramm, and colleagues in 1956. To the Western press, freedom is inviolate; if we allow freedom of the press—even to the voices we abhor—eventually the truth will out. This is the classic libertarian and Jeffersonian concept of the press. It assumes, of course, that everyone has access to mass media channels. Indeed, at the time of the writing of the First Amendment, the owners of the press in North America were individuals. The book misses the chance to evaluate Third World contentions concerning the influence of corporate-owned media today.

McPhail's book disappoints on several counts. We should expect any new exegesis of the "new international information and com-

munication order" (to use the proper UNESCO term) to be both accurate and balanced. But in his attempt to be even-handed on the opposing viewpoints, McPhail loses the substance of the debate and presents a flaccid analysis.

McPhail makes his strongest point during his discussion of development journalism. He notes that the Third World move for "development journalism" (directing the information resource toward national development) should not be so casually denigrated by the Western press, which sees this as the first step toward censorship. After all, he points out, the Western press, too, is a development press and has, in fact, "successfully developed itself into an ideological arm of the capitalistic and free enterprise system."

The errors in attribution are unfortunate. There are, additionally, many typographical errors—a good example is "the preestablishment sentiment of the Western media" for "pro-establishment." A number of noted scholars' names are misspelled, and the U.S. International Communication Agency in 1980 is referred to by its former name, the United States Information Agency. Were it not for the errors, this book could be recommended for undergraduates and newcomers to the debate. ■

Reviewed by Howard H. Frederick, a doctoral student in international communications at the American University, Washington, D.C.

3 ***Bringing Women into the Community Development Process: A Pragmatic Approach,*** Marion Fennelly Levy. (Westport, CT., 1981, Save the Children), 47 pp.

This 47-page handbook discusses Save the Children's experience and efforts over the last 15 years to involve women in the programs provided by the Save the Children Federation in the developing world. The book, which begins with a refreshingly candid appraisal of Save the Children's assistance to women in recent history, covers a great deal of material in a thoughtful manner.

To the organization's credit, Save the Children took a hard look at its programs and its own internal organization and staffing patterns and realized the benefits women derived from its development efforts usually came as an afterthought. Women were invisible except when seen as an appendage to the hungry mouth of a child, or as a vehicle to carry water, or as a purveyor of medicine. Moreover, there were virtually no women development professionals on the field staff of the organization, a lack which tended to reinforce the invisibility of women. When economic development programs were promoted by Save the Children in villages with subsistence-based economies, the participants, trainers, organizers, and chief beneficiaries of the new programs were typically men, and it was clear that the newly generated income earned by these men was rarely, if ever, used for their families.

The handbook describes how Save the Children came to these hard realizations and what remedial steps they took. The author chronicles the changes in staffing in the organizational structure, and discusses how the changes complemented attempts to design programs specifically for the benefit of women. Case studies for women's programs in Upper Volta, Colombia, Honduras and Indonesia are presented.

Save the Children should clearly be lauded for its courage in asking difficult questions and its willingness to challenge traditional cultural attitudes toward women in the developing world. Perhaps the only criticism that can be made of this paper, and it is a relatively minor one, is that the case studies presented are not as candid as they could have been about the results of the programs. Upon close reading, the case studies reveal that the programs raised expectations of women and very little else—certainly they had little significant impact on their economic subsistence. After organizing women into community clubs, providing support for skills training in traditional home-centered activities such as cooking and sewing, and offering minimum financial assistance, Save the Children led the women to believe they could generate income. While the organizing and training were successful, the economic development goals often failed because there was no market for the products. The conclusion offered for the failure was not that the design of the program should be altered, but that the women should have known more about marketing and management in the first place.

This work is a valuable one and the lessons learned will undoubtedly be put to good use in the future. It is a sensitive attempt to make palpable changes in the lives of women in the developing world. It should be read by all persons concerned with development issues, and is highly recommended.

The booklet includes a bibliography on women in development in the Third World. ■

Available for U.S. $2.00, plus US $.50 for handling, by writing the Public Information Department, Save the Children Federation, Westport, Connecticut 06880 USA.

Reviewed by Arlene Horowitz, a program assistant in the Clearinghouse on Development Communication.

Note: ***Illustrations for Development,*** reviewed in *DCR* #34, is available from the Afrolit Society, P.O. Box 72511, Nairobi, Kenya.

4 ***Women and Media in Asia,*** edited by Timothy Yu and Leonard L. Chu (Center for Communication Studies, The Chinese University of Hong Kong, Hong Kong, 1977), 251 pp. US $5.00.

This book is a report of the Asian Consultation on Women and Media, a seminar held in Hong Kong in 1976. The meeting was sponsored by the Center for Communication Studies of the Chinese University of Hong Kong for communication educators and professional journalists of Asian countries. The report includes all the papers presented at the Consultation and a summary of the discussions. No attempt has been made, however, to synthesize the main lines of the discussion. The reader is presented with raw material and asked to plow through unaided. Fortunately, each paper is short and concise, which makes the task easier. Nevertheless, one wishes that the editors had set the meeting in its proper perspective and helped us capture its spirit.

When looking at the Consultation's agenda it is important to remember that it took place in 1976. This was only a year after International Women's Year and the Mexico City United Nations Conference on Women, which for the first time brought women's issues to the attention of the general public throughout the world. In 1976, consciousness raising was only beginning, discussions were passionate, and the limits of the debate were less defined. Agendas therefore tended to be wide open and to cover a lot of territory.

In this compilation, the first two series of papers consist of factual presentations on the legal and social status of women in various Asian countries and on the situation with regard to access to education and employment in mass media. Today, one would probably not devote as much time to this background information. In the last five years, the pool of knowledge on women's issues has greatly increased so that such basic facts and statements-of-the-situation are less useful.

The papers on education and access to media focus almost exclusively on media as a career for women: do women have equal opportunities for training, employment, and advancement in the media industry? Not surprisingly, it is generally found that although education opportunities are improving, job prospects for women in the media are not as good as those for men. Although the 1981 reader may be impatient with what now seem to be generalities, it is clear on reading the discussion in these papers that they provoked a lively exchange on such issues as women and work in general, the difficulty for women of assuming both career and family responsibilities, their ability to carry out the same assignment as men, prejudices, attitudes, stereotyping, etc.

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The second part of the Consultation consisted of four position papers which tried to cover several areas: portrayal of women's role in the media, women's contribution to national development through mass media, opportunities for training women for media careers and widening their involvement. In these papers the debate was at times broadened from the "media" level to the "communication" level but there was generally little time to probe. Issues such as the role of communication in development, media as an agent of change and a consciousness-raiser, the contribution that women can make through the media, and mass communication as a social process were raised but not analyzed in any depth.

The worldwide influence of the United States in both media and women's issues is very much in evidence throughout the book. One notes that of the 17 persons who presented papers during the consultation, 13 received training in the West, 11 of them in the United States. This is obviously a source of concern to the Asian participants and it should be noted by Americans who train specialists from other countries. Participants remarked that scholars trained in the United States often did not know how to apply their knowledge to the Asian situation, and that modern mass media techniques were too often imported from Western countries without sensitivity to the local situation. Asian communication students therefore face a double challenge: educating themselves in a different culture and then adapting their knowledge to their own environment.

The problem of transcultural influences is also evident with regard to the women's movement itself. During the discussion, the participants revealed the difficulty they had in understanding the development of the movement in the United States, and in finding the parallels and the differences in the situation of women in the United States and Asia.

In the end, the book provides some valuable historical material both on the subject itself—Asian women in the media—and on how the issue was approached as little as five years ago. It was used extensively in the worldwide study on "The Portrayal and Participation of Women in the Media" which was prepared by Margaret Gallagher for UNESCO (Paris, 1979) and therefore constitutes a primer in this field. Its main weakness lies in its attempt to cover too much ground too quickly, without attempting either to focus on main points or to give a sense of direction for future study or action. ■

Reviewed by Line Robillard Heyniger, consultant on international and women's issues, Montreal, Canada; international associate, Women's Institute for Freedom of the Press, Washington, D.C.

Small is Powerful

Microcomputers and microprocessors today are small enough to fit into a pocket, cost between US$ 100-300, and can run on small batteries. They are also on the order of 20 times faster and thousands of times more reliable than the early models first developed in 1946.

The advertising of IBM (International Business Machines) gleefully points out that an equivalent gain in the automobile industry would put the price of a Rolls Royce luxury sedan at about one nickel (US$ 0.05) in 1981.

The key development was the integrated circuit. Transistors are components of an electric circuit used to amplify, detect, or switch the flow of electrons. Their development in 1947 transformed electronics, as they made vacuum tube circuitry largely obsolete.

Current innovations continue to pack more and more circuitry onto chips. In 10 years, manufacturers expect to cram more than a million components into their units. With the addition of information processing capacities—computing functions—to silicon integrated circuits, the microprocessor is created.

Instructions on how a microprocessor will shunt electrons within the myriad of circuits, to perform logic functions such as calculation, are established beforehand. Function determines design and manufacture. This is called programming, and it is in the programming of microprocessors to apply their enormous flexibility for handling information that the future of microelectronics lies for developing countries.

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From Mexico comes a timely newsletter, in Spanish, *Síntesis Informativa,* published by the Instituto Latinoamericano de la Comunicación Educativa. Regional news about training courses, institutional activities, policy issues, and communication books in Spanish is regularly provided. Subscription information may be had from ILCE, Apartado Postal 94-328, México 10, D.F., México.

Mentioned in these pages earlier, *Video Educativo Rural (VER),* published in Spanish, in Lima, Peru, continues to be a useful vehicle for sharing the experiences of video used for education and training in rural Latin America. Users are urged to participate in the network. Contact CEPAC, Proyecto PER 76/003, PNUD-CENCIRA-FAO, Apartado Postal 4480, Lima, Peru, for further information.

"Women and the Media" is the focus of *ISIS International Bulletin* number 18. Articles on issues such as the image of women in the media, women and pornography, and media as manipulation, do a good job of raising consciousness in an area that is receiving increasing attention worldwide. For information on this issue of the *Bulletin,* contact ISIS, Case Postale 301, CH-1227 Carouge, Switzerland.

The International Women's Tribune Centre has published an interesting newsletter, in English and Spanish, on Women and Media. Project information, lists of organizations, titles of appropriate books and periodicals, production resources, UN policy news, and other useful information is presented in lively fashion. The Centre is located at 305 East 46th Street, New York, N.Y. 10017, USA.

Those of our subscribers who read Spanish may be interested in two series among the publications from the Fundación para el Desarrollo de la Región Centro Occidental de Venezuela (FUNDECO). One series of 11 publications is on Social Communication and Development (Comunicación Social y Desarrollo), the other series of 15 publications is on Social and Educational Research (Investigación Social y Educativa), from which we have sampled two: *Investigación sobre Radio-Foro como Método para Lograr Participación Campesina y una Efectiva Divulgación Agrícola* and *Análisis de Contenido de los Mensajes Agrícolas en la Prensa y Radio Venezolana y su Utilidad Según los Campesinos del Estado Monagas.* Both of these studies show a thorough knowledge of communication theory, diffusion of innovation, conceptual models, and participatory research, and have useful bibliographies of Spanish works in these fields. A publication and price list may be obtained from FUNDECO, Apartado 523, Barquisimeto 3001-A, Estado Lara, Venezuela.

Also available in Spanish are the papers from the First Colloquium on Educational Television in Mexico (Primer Coloquio de Televisión Didáctica en México), sponsored by the Academia Mexicana de la Educación, and held in June 1980. Among 12 interesting papers are one on Mexico's new Rural Television Network, one on the Mexican experience using television for literacy, and c[illegible] on the costs of educational TV. Mexico is obviously concerned with providing and improving basic education for all its population, as well as with relating education to production needs and skills. The papers collected here reflect this concern, and should be welcomed by other Latin countries with similar goals. ■

Available for US$6.00 from the Academia Mexicana de la Educación, Cerro San Gregório No. 6, Mexico 21, D.F., Mexico.

By Judy Brace

Introducing Hybrid Cocoa to Nigeria: Communications Help Persuade Farmers

by C.A. Ogunmilade

This article examines the adoption of hybrid cocoa in Ondo state in Nigeria. It identifies the motives that led to the decision to adopt the new crop and discusses some of the problems that were encountered in the process. It also illustrates the process and impact of communication, and examines the role of the change agents in the whole process of diffusion.

Ondo State, formally Ondo Province, is one of the 19 states that were created in Nigeria in 1976. It has an area of 18,165 square kilometers and a population of about 2.3 million, mostly farmers. With its tropical climate, it produces more than 60 percent of the Nigerian cocoa. Cocoa is the mainstay of the state's economy, and is second only to petroleum as Nigeria's largest export.

Before the introduction of the hybrid cocoa in the state in 1954, the farmers planted native cocoa. The trees yielded abundant fruits for eight to ten years after planting, but productivity quickly declined thereafter. The old cocoa trees became tall, and the scattered fruits on them were very difficult to reach during harvest. In the three years from 1950 to 1953, production dropped noticeably, and income of both the farmers and the government fell. The government was concerned, and took action.

The then-Minister of Agriculture and Natural Resources for the Western State of Nigeria, who incidentally came from the state, undertook a cocoa tour of the West Indies and Brazil in 1954. He and his colleagues came back to Nigeria with sample fruits, pictures, and demonstration packages of another type of cocoa, known as the "hybrid cocoa," for which the Ondo State of Nigeria is well known today. What was responsible for the ultimate decision to adopt the hybrid cocoa, a crop that up to 1954 was foreign to Nigeria? Were alternatives considered? Were there models to guide the government in its decisions concerning these issues? What role did communication play in the process?

First, there were many models to choose from, and most of the experts in the Ministry of Agriculture and Natural Resource, architects of the innovation, had studied in Italy, Brazil, the United States, or Canada. Their initial approach was similar to the Research, Development, Diffusion, Adoption Model postulated by Clark and Guba. The government asked the Cocoa Research Institute of Nigeria (CRIN) to look into the problem of low yields from native cocoa, perform experiments on both the old and the new crops, and advise the government on its findings. The Institute did experiments and concluded that: the hybrid cocoa would do as well as the native cocoa in Nigeria; that it would mature in three years as opposed to a minimum of five years for the Nigerian cocoa; that the hybrid was bigger and more productive; and that it could capture the world market in the future.

There were also suggestions that the farmers should be given loans to reactivate their own cocoa, crops which had been passed on from generation to generation. Some planners considered the hardship the innovation would bring to the old farmers, and there were government functionaries who were skeptical about "this foreigner from Brazil." At this time, the campaign had not got to the farmers. However, government decisions on the matter, and its eventual follow-up, combined many principles, models, and forms of communications, each useful at a particular stage. At times, a combination of several of the models was used.

Communications Campaign

Farmers were made aware of the new cocoa through the rediffusion programs broadcast on a special frequency, government information vans, mobile cinema shows; through head chiefs and councillors; and at times in churches and mosques. The government first performed the experiments on its demonstration farms, planting the seedlings and nursing them for about a month before transplanting them. Films and pictures of the processes of planting and growth were then shown in all the local towns and villages, and farmers were in turn encouraged to make their own nurseries. In addition, half-hour programs on agriculture were presented on the radio rediffusion three times a week to create awareness, sharpen the interest of the farmers, and highlight the advantages of adopting the hybrid cocoa. Individuals and groups were contacted and discussions went on at the village level. In effect, no single model was adopted exclusively, and interpersonal communications were stressed.

Initial Resistance to New Crop

Initially, the innovation encountered a lot of resistance. There was opposition from farmers above the age of 45 who were no longer strong enough to cultivate new crops. They wanted the government to reactivate their old crops instead. Other opposition came from the few rich farmers, whose prestige was based on their control of the largest holdings of cocoa in their respective villages. They feared that in the "new age," when everybody would have to start from scratch, their positions would be threatened.

Equally difficult for the farmers was the idea that the dying cocoa trees should be cut down and replaced with hybrid cocoa seeds or seedlings. The farmers considered not only the hardship that such deliberate cuts would entail, but also the "psychological pain" of destroying what was handed down to them by their fathers—crops they wanted to hand over to their own children some day.

In Ondo State, there were several categories of adopters. The innovators were few, but very influential. They were, curiously enough, teachers and other professionals who considered farming a hobby. The early adopters were the opinion leaders. Both the innovators and the early adopters were mobile, cosmopolitan, adventurous, and open to external influence.

Roles of Different Groups

More remarkable in the process of change was the role of the formal and the informal groups. These group members were not the early adopters; they came in late but formed the majority. They were mostly farmers and, very often, they made far-reaching political and economic decisions. The groups between the ages of 25 and 35 were unique. They wanted success, and shared common goals, attitudes, and approaches to life. When they heard about the hybrid cocoa, they invited the Ministry officials to educate them about the new product. The agricultural assistants, who were really the change agents in the districts, took over from there. They made demonstration beds in the villages, and planted the new cocoa seeds and nursed them. Early in the morning and again in the evening, farmers were invited to watch the Agricultural Assistants. They would ask questions, and would take some seeds away for planting. The State Ministry of Information was very useful too. Information workers took beautiful pictures of the new crop, and displayed posters to emphasize the advantages of adopting the new cocoa.

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Development Communication Report, published quarterly by the Clearinghouse on Development Communication, has a circulation of over 6,000 development professionals. Subscriptions are available free of charge to readers in the developing world.

A center for materials and information on important applications of communication technology to development problems, the Clearinghouse is operated by the Academy for Educational Development, a nonprofit planning organization, and supported by the Bureau for Science and Technology of the U.S. Agency for International Development as part of its program in educational technology and development communication.

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Readers are invited to submit typed manuscripts of no more than 1000 words, and to send in photographs.

Technical Assistance Spans the Pacific:

VITA Volunteers Share Energy Information by Satellite

by Gary Garriott

For more than twenty years, Volunteers in Technical Assistance (VITA) has sent information on low-cost technologies by mail to thousands of requestors, primarily from the developing countries, as well as provided on-site consultancies and project management. Approximately 4,000 volunteer experts throughout the world contribute their time to these activities. Recently, VITA has begun experiments which involve sending information by interactive media to supplement mail services in the hope that immediate information transfer will be more timely, and, therefore, more likely to be used in actual development activities.

Teleconferences Highlight New Program

One such experiment currently being pursued by VITA is a series of two-way audio teleconferences on renewable energy technologies beamed to potential users in the Pacific region via the PEACESAT system. PEACESAT is a consortium of government and educational institutions that employs NASA's Application Technology Satellite ATS-1, launched in the 1960's and now dedicated to public service use for its remaining lifetime. Approximately 20 ground stations throughout the Pacific have been installed linking such locations as Saipan; Lae, Papua New Guinea; Wellington, New Zealand; Rarotonga, Cook Islands; and other sites within these general boundaries. Since ATS-1 is a high-powered, global beam satellite and uses uncomplicated VHF (very high frequency) transmitting and receiving equipment, earth station equipment is inexpensive and several earth stations have been installed for under a thousand dollars each. Portable operation from remote rural areas is also possible.

Volunteers Coordinate Conferences

Under its AID-supported Renewable Energy Program, VITA has thus far used home office staff and volunteers located throughout the geographical U.S. to produce and coordinate a series of conferences on the following topics: solar hot water heating, wood gasification, woodstoves, wind-electric systems, and bio-gas. Second conferences on wind-electric systems and cookstoves have also been held. Depending on the location of staff and volunteers making presentations, either conference calls or simple long-distance calls are made to the uplinking ground station terminal. The calls represent the only cost to VITA (other than mailing literature).

Experience thus far shows that it is quite easy for even first-timers on the conference network to get used to the idea of communicating via satellite with people 9,000 miles away. Only "simplex" operation is possible; that is, one person talks at a time and must end his or her transmission with "over to Suva," for example. Sessions are "chaired" by whatever terminal initiates the conference or by the terminal where the VITA participants are. "Chairmen" request reactions and comments from participating terminals in turn. Since PEACESAT is relatively unsophisticated in terms of hardware, the need for frequent repetition and signal checks and the informal nature of the sessions themselves provide an unthreatening environment in which newcomers almost instantly feel at ease.

Future topics are selected during conferences themselves or during weekly scheduling sessions. A former VITA employee, now at the University of Hawaii, is an operator at the Honolulu terminal and provides necessary logistical continuity with stations and VITA as well as feedback on the usefulness of the material presented. Uplinks are accomplished through PEACESAT terminals in Santa Cruz or Honolulu. A quasi-private station in Florida has also been used for accessing the network, and VITA is studying the possibility of acquiring a low-cost terminal of its own if conferences continue over a long period of time.

Preplanning Vital to Success

Since the sessions are primarily technical in nature, experience to date indicates that pre-conference written materials are essential to a good exchange of information. Topics are usually set a month in advance to allow time for pre-conference mailings of subject materials. Terminal managers distribute this technical material to interested parties (thus far, mainly mid-level government officials and planners, development technicians, and university personnel). Participating VITA staff and volunteers have also previously studied the material. Typically, a conference consists of short three- to five-minute presentations on the subject by staff and volunteer experts (together with other Pacific conferees who may already have expertise on the topic) followed by questions and answers. Post-conference information is also forwarded to participants when appropriate.

A continuing concern is how to assure that participants are able to use the information for construction of actual projects. One way seems to be to encourage active participation of groups that have a particular technological focus. For example, a Pacific-wide Women's Interest Group has begun a series of conferences on smokeless stoves that only require slight modifications for greater efficiency and reliability. Increasingly, the women provide the VITA staff and volunteers with technical information that they did not previously possess, information which is then made part of VITA's technical library for reference and distribution to future Pacific island requestors.

Focus on Specialized Objectives

VITA is also designing conferences with specialized objectives. One type will be for "advanced" participants who are already knowledgeable in a certain technology and need specific and specialized information. In addition, "Resource Acquisition Seminars" will provide administrators with the knowledge of existing foreign development resources. VITA recently surveyed over 500 organizations worldwide that promote the use of appropriate technologies and found that in addition to information (primarily on other projects), short-term technical consultations and financing (particularly in small, manageable amounts) were important for project implementation. We believe that such seminars on how to tap resources will help Pacific planners put together appropriate resource packages for their development needs.

VITA hopes that the current teleconference series will provide Pacific governments and groups with timely information on renewable energy in an immediately useable, low-cost form—certainly growing and critical concerns of energy-dependent island economies. The vast expanse of territory, rising air fares, and mail service delays will increasingly enhance the value of teleconferencing as an alternative to jet travel.

Basis for Replicating Project

In this light, it is indeed unfortunate that there are presently no low-cost alternatives to PEACESAT when ATS-1 finally dies or is removed from service, possibly within a year. There is obviously a sound basis for replicating the PEACESAT experience in public service sectors of other developing countries as long as operating costs can be kept low and hardware uncomplicated. The marriage between low-cost renewable energy technologies and "appropriate" satellite conferencing technologies is natural, and, we believe, one that could have wide application for struggling economies everywhere. ■

To obtain further information contact: VITA Inc., 3706 Rhode Island Ave., Mt. Rainier, Maryland 20822, USA.

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On File at ERIC

International communication problems, the effects of television dependence on political views, and developments in the area of broadcasting satellites are addressed in the reports reviewed in this column. All are available in microfiche from the ERIC Document Reproduction Service (EDRS), P.O. Box 190, Arlington, Virginia 22210, USA. Some of them are also available in paper copy.

• *The Media Crisis.* Miami, Florida: World Press Freedom Committee, 1980, 114pp. (ED 193 718)

Those who have been involved in UNESCO debates on the media and on the New World Information Order offer comments on the proposals of the MacBride Commission, a group appointed by UNESCO to study the problems of international communications. Specific topics addressed include (1) the right of access to private and public sources of information; (2) special protection for journalists; (3) licensing of journalists; (4) employment of journalists by intelligence agencies of any country; (5) a proposed international center for study and planning of information and communications to be established within UNESCO; (6) private ownership of news media; (7) problems created by advertising; and (8) taxing of transnationals. Available from World Press Freedom Committee, Miami Herald, 1 Herald Plaza, Miami, FL 33101 (postage only), or EDRS in microfiche for 91¢ or paper copy for $8.60 plus postage.

• Becker, Lee B. and Fruit, Jeffrey W. *The Growth of TV Dependence: Tracing the Origins of the Political Malaise.* Paper presented at the annual meeting of the International Communication Association, Acapulco, Mexico, May 18-24, 1980, 29pp. (ED 196 082)

A heavy dependence on television news has been linked by research with lower levels of knowledge about the political system and negative evaluations of that system, i.e., political malaise. This paper uses data from three different sources to examine more closely the shift away from print toward dependence on television for news, to determine the linkage between needs and dependency, and to determine changes in the linkage between needs and dependency over time. In general, it is expected that an examination of the needs of the audience will reveal some causes of the increased dependence on television. It may be that viewers watch television in part to avoid conflict, yet the conflict included in news programs is the very thing producing their frustration. Available from EDRS in microfiche for 91¢ or in paper copy for $3.65 plus postage.

• Curran, Alex. *Direct Broadcasting Satellites—Myth or Reality.* Paper presented at the annual meeting of the International Institute of Communications, Ottawa, Canada, September 8-11, 1980, 14pp. (ED 192 405)

Pointing out that, contrary to expectations, there is still no fully operational direct broadcasting satellite system 23 years after the launching of the first satellite, Curran poses several questions. Is there a perceived need for such a system? Is the technology available at cost-effective levels? Has that technology been adequately tested? Would the system create more problems than it would solve? He suggests that there is a need for direct broadcast satellites to serve large areas of low population density, and that the availability of the technology at cost-effective levels has been demonstrated by experiments and studies; e.g., low power-level satellites have proved to be especially cost effective in Canada. He cites three satellite launches—HERMES, serving Canada, the U.S., and Australia; URI, serving Japan; and ANIK-B, serving Canada—and discusses new projects being considered in nine countries. He concludes with a look at some problems arising from the fact that satellite signals cross national borders. Available from EDRS in microfiche only for 91¢ plus postage.

• Maeda, Jiro. *Direct Broadcasting Satellites in Japan.* Paper presented at the annual meeting of the International Institute of Communications, Ottawa, Canada, September 7-11, 1980, 26pp. (ED 192 404)

This discussion of the development and use of broadcasting satellites in Japan describes the medium-scale experimental broadcasting satellite, YURI, which was launched by NASA in 1978. Experiments with YURI in several different areas—basic technologies in the broadcasting satellite system, satellite control technologies and operational control techniques, and the reception of radio waves from a broadcasting satellite—are reported to have shown favorable results and to have suggested that practical applications of broadcasting satellites are technically feasible within the foreseeable future. A recommendation is made to the Space Activities Commission of Japan that an operational broadcasting satellite be launched in 1983, prior to the planned launchings of space platforms in 1985 and 1990. Objections of commercial broadcasters who fear disruption of regional broadcasting by broadcasting satellites are also presented. Available from EDRS in microfiche only for 91¢ plus postage.

Barbara B. Minor, Publications Coordinator, ERIC Clearinghouse on Information Resources, School of Education, Syracuse University, Syracuse, New York 13210, USA.

Keeping Current: Periodicals to Note

We would like to draw our readers' attention to some of the communications periodicals that are received in the Clearinghouse.

URTNA Review/Revue de l'URTNA is a bi-annual French-English communications journal, published by the Union of National Radio and Television Organizations of Africa (URTNA). This organization promotes, develops, and coordinates radio and television activities in Africa. The *Review* features organizational and conference information, and a recent issue contained a lengthy report on rural radio in Anglophone Africa with useful, country-specific information. For subscription information, contact *URTNA Review,* 101 rue Carnot, B.P. 3237, Dakar, Senegal.

Interface is a bi-annual journal, in English, published by the Department of Communication and Journalism, Osmania University, Hyderabad 500 007, India. The journal tries to strike a balance between academia and the community, international communication issues and national media concerns. Contact the Editor at the above address for subscription information.

Also from India comes the interesting monthly bulletin of the Research Institute for Newspaper Development, *RIND Survey.* It contains technical printing and equipment information, discussions of policy issues, and book reviews. For subscription information, contact CGK Reddy, 38 Pantheon Road, Madras 600 008, India.

A newsletter that can be relied on to give clear coverage to current issues of international communication policy is the *Chronicle of International Communication.* Published monthly by International Communication Projects, Inc., in cooperation with Temple University's School of Communication and Theater, the *Chronicle* regularly provides information on transborder data flow, the debate on the New World Information Order, education issues and conferences, as well as brief book reviews. Subscription information is available from ICPI, P.O. Box 2596, Washington, D.C. 20013, USA.

An informative and carefully edited journal is *Media Development,* published quarterly by the World Association for Christian Communication, in London. Recent lead articles have focused on alternative news and information services, the New World Information Order, and Latin American grassroots structures of communication. Good coverage is given to media's use for social service throughout the world, and abstracts in Spanish are frequently provided. WACC offices are at 122 King's Road, London SW3 4TR, England.

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Focus on Women

Three years ago, the report from an international workshop held in Bangkok by the Asian and Pacific Centre for Women and Development stated that the media were "actively contributing to corroding the dignity of women. . ."

A new film produced by the United Nations (UN) Department of Public Information reviews the image of women as shown in film and TV in India, Egypt, and the Dominican Republic. The film takes a strong stand against injurious stereotypes and supports efforts by women to assume responsibility for the improvement of their own lives.

India's vast film industry perpetuates the notion that women's happiness comes from "submission to the right man." In the development of this theme, Indian films traditionally provide escapism and vicarious materialism as well as predictably happy endings. Their content does nothing to enhance the dignity of women. Not suprisingly, the technical functions of film production rest exclusively in the hands of men. Only now is the National Film Institute of India beginning to train women in camera, sound, lighting, editing, and other technical skills.

A paradox exists in Egypt's busy world of television production. Because radio and television salaries in government broadcasting are lower than those in the press or in other countries' broadcast media, a large proportion of the jobs are held by women. Electronic engineering is considered a "feminine" profession, broadcasters are usually women, and the head of the country's TV programming is a woman. All the more striking, then, is TV's perpetuation of old stereotypes of the role of women, a diet fed daily to an audience of one million families. A social researcher interviewed in the film discusses her study of women's images portrayed, and finds that in the immensely popular soap operas, when the husband strays—threatening the stability of the venerated family—the disruptive cause is typically a female university student or a working woman.

In striking contrast to the first two, the final segment of the film shows programming by, for, and about women who are making an effort to change and improve the conditions of their lives. It features a TV program showing women making decisions and taking charge. Although the weekly half-hour show, "Diferentes pero Iguales," presents many public service types of activities (see *DCR* #25, January 1979), the film documents only one: a group of rural women who have pooled their resources (without the support of the men of the community) to buy a herd of goats. Their determination gives them new confidence and skills. ■

Reviewed by Judy Brace

Focus On Women *(color, 16mm, 28 min.) is available in English, Spanish, and French. In the U.S. it can be purchased for US $300 from the United Nations, Room 807, New York, NY 10017, USA, attention Ms. Brooke Landis; to rent, it is available for US $30 from the New York University Film Library, 27 Washington Place, New York, NY 10003, USA. In Canada, the film is available from Marlin Motion Pictures, 47 Lakeshore Rd. East, Port Credit, Ontario, Canada L5G 1C9. In other countries, to borrow the film, contact a United Nations Information Center, or any of the UNDP film libraries.*

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At the adoption stage of the process of diffusion, the change agents were very effective. They came from the Yoruba land, spoke the language of the people, interacted freely with them, understood the intricacies of their social system, and were prepared to respect them. The farmers in turn gave respect and recognition to the Agricultural Assistants.

However, all was not smooth sailing. It was not easy for them to work with individual farmers. First, there were only a few change agents, and part of their time was spent making field reports at their Ministry headquarters. Second, the farmers themselves were not easy to find except on weekends. Most of them slept on the farms from Monday to Friday; others went to the farms very early in the morning only to return late at night. The change agents could not meet them on the farms because, at certain times of the year, the bush paths were risky, muddy, and impassible, and the farms were far apart.

Laggards and Reluctant Old Men

The opinion leaders were very effective. They were part of the system, much respected and loved, widely travelled, and they had embraced the innovation much earlier. Since their new crops were doing well, they had little difficulty in convincing others, except those who were lazy, to follow suit. The lazy farmers and the old men were the greatest headache for the agents. The latter stuck to their native cocoa until lesser yields drove them to frustration and unhappiness. The members of this group could be rightly referred to as the laggards.

1960 was a crucial time in the adoption of the hybrid cocoa because some of the early plantings had started to bear fruits on a large scale. People began to see that the hybrid cocoa was better, and the young farmers were taking more money home than the elders who had earlier dominated the market. Tongues started to wag.

Mobile vans, mainly organized and funded by the Ministry of Information, mounted campaigns of words and posters in all the important places in the state. Pictures of farmers nursing the young plants, spraying the cocoa pods, and enjoying the fruits of rich harvests, were made available. Programs such as Cooperative Half Hour, *Agbe Onije Ojumo* ("The farmer who works hard will eat every day"), and *Exe Agbe* ("The farmer's gain"), came up regularly on the rediffusion networks.

Lives Changed By New Cocoa

The new crop was better from the standpoint of yield, quality, and productivity. What were some of the effects of this improvement? Students who had earlier suffered as a result of lack of funds could go back to school. New and beautiful houses sprang up to replace some of the old dilapidated ones. People acquired transistor radios, and later, televisions. Farmers could now buy what they needed, and more people had money. New businesses, such as trading, and arts and crafts, developed. As people became more mobile, social interaction increased.

Traditionally, the few young men that had cocoa had inherited it from their fathers. The old men ruled the towns and villages because they controlled the source of wealth, and thus had influence and power. But by the 1960's, the old order had changed, yielding to the new, and this was evident in almost every aspect of life.

However, the adoption of the innovation brought with it many social problems. Stealing became more common. Young men who had no cocoa resorted to theft to meet the challenge of the new situation. Litigation abounded as a result of arson, public fighting, and seduction of other people's wives. Many young men became reckless as a result of drunkeness, and had fatal accidents on their vehicles.

Perhaps most significant was the erosion of the traditional system of settling disputes and quarrels at the feet of elders. Elders no longer had power, because they did not control the purse strings. Young men took their cases to court, rather than presenting them before the elders.

Some of the above-mentioned points were indirect but very important effects of the innovation. However, for most people, for most organizations, and even for the government (by way of more revenue), the adoption of the innovation brought about positive change. Without the use of a persuasive and coordinated communications campaign, which in this case relied primarily on interpersonal communications, it is doubtful whether the new cocoa could successfully have replaced the old in such a short time. ■

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As we have seen, agricultural information is needed by a wide range of users, from administrators and financiers to research scientists and extension workers. Frequently it is not practicable for international services to be aimed directly at these user groups, particularly in the case of the farmer himself, the end-user of much agricultural information.

It is instead necessary to have intermediaries who are responsible for repackaging the information in line with local needs and conditions. For example, the role of the extension officer or agricultural adviser in transferring the results of laboratory and field trials into tangible benefits cannot be too highly emphasized. Such benefits include increased crop yields and improvements in the well-being of the rural population. The agent's local knowledge of ecological and social constraints is invaluable in selecting the appropriate information and presenting it in the appropriate way.

Specialized Centers

In recent years many specialized agricultural information centers have been established in developing countries. These consist of the information departments of both the international centers financed by the Consultative Group on International Agricultural Research (CGIAR) and research or training centers set up by regional or national governments. These information centers have tended to concentrate either on one specific crop (or small group of crops) or on the particular agricultural priorities of their country or countries in their region.

These centers are ideally placed to act as intermediaries, accessing international systems and selecting, reprocessing, and repackaging material for dissemination to their own users. This process should not only include the usual selective dissemination of information and retrospective search services, but also such tasks as the regular production of specialized collections of abstracts or indexes as is done by the Cassava Information Center at the Centro Internacional de Agricultura Tropical (CIAT) in Colombia, and the Agricultural Information Bank for Asia (AIBA) in the Philippines.

The production of newsletters and bulletins, the organization of translations and the distribution of up-to-date reviews on specific topics for extension workers can also be useful and much-appreciated functions of these specialized centers.

The establishment of national, regional, and international information networks is essential for their successful operation. This is an area in which fruitful collaboration between developing and industrialized countries should be sought. However, it should always be remembered that the system developed must be appropriate to the needs of the users and the conditions prevailing in the country in which it will be used.

In some developing countries computer systems have been successfully established, but a computer should not be used just for its own sake. All too often grandiose schemes for interconnected networks have been proposed, and sometimes even implemented, without any basic information science groundwork to discover who is the user, what are his or her needs, and whether the system will provide answers in a usable form. It is far better, in some cases, to develop simple systems based on photocopies of contents pages, such as the East African Literature Service and the CIAT Contents Pages in Agricultural Science. These are effective and are extremely popular with users.

AGRIS, CAB, ATA

Of the many information services available, only one attempts to serve all user groups with a "comprehensive inventory of world-wide agricultural literature," and that is the FAO International Information System for the Agricultural Sciences and Technology (AGRIS). Other services have more limited aims. They may provide "a world agricultural information service" covering material of "scientific importance" as does the Commonwealth Agricultural Bureaux (CAB) or, as in the case of Abstracts on Tropical Agriculture (ATA), "a selection of material of practical interest to agricultural development and extension workers in tropical and subtropical areas."

Many suppliers also offer selective dissemination of information (SDI) services. This is another way in which the data base may be broken up into smaller sections more relevant to a specialized center's needs.

Bibliographies and reading lists, compiled either on specific request or as a series of publications from the major suppliers, can also be extremely useful products for specialized centers.

The alerting function of international services is all very well, whether by means of journals, specialized bulletins, SDIs, bibliographies or magnetic tapes, but what the user really wants is information; a bibliographic reference alone often will not suffice. The data base supplier can help in two ways: by including informative abstracts in his publications, and by providing a document delivery or photocopying service.

Abstracts

Well-presented, informative abstracts can replace the original documents to some extent. This is an extremely important aspect of the provision of information in the developing countries, but even in industrialized countries users prefer SDI services which include abstracts to those which do not.

Summary

International information services must support the specialized centers and promote their development into real "centers of excellence," so that they become *the* place in the world for information on their specialization. (This is already the case with a number of them.) In many instances, improvements in internal and external communications and coordination of services within countries or regions are vital if national and regional centers are to achieve these aims.

Agriculture will maintain its priority position in the economic and social development of most Third World countries and the need for information services will increase. It is only by close cooperation between developing and industrialized countries that this challenge can successfully be met. ■

The organizations mentioned in this article may be contacted at the following addresses:

AGRICOLA: The United States Department of Agriculture National Agriculture Library, Beltsville, Maryland 20705 USA

AGRIS: FAO International Information System for the Agricultural Sciences and Technology, AGRIS Coordinating Center, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy

AIBA: Agricultural Information Bank for Asia, The University of the Philippines, Los Baños, Philippines

ATA: Abstracts on Tropical Agriculture, Koninklijk Instituut Voor de Tropen, Asdeling Agrarisch Onderzoek, Advisory and Documentation Division, Mauritskade 63, Amsterdam, Netherlands

CAB: Commonwealth Agricultural Bureaux, CAB Secretariat, Farnham House, Farnham Royal, Slough, SL2 3BN, England

CGIAR: Consultative Group on International Agricultural Research, Secretariat, 1818 H St. N.W., Washington, DC 20433 USA

CIAT: Centro Internacional de Agricultura Tropical, Apartado Aereo No. 67-13, Cali, Colombia, SA

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Information Systems

New Resources for Agricultural Information Being Developed Around the Globe

by Peter Thorpe

In place of a "Dilemma in Country X" for this issue, we are reprinting an article from Agricultural Information Development Bulletin. *The author presents a communications problem familiar to many: where can people in developing countries with scarce library resources turn for information; in this case, agricultural information? The author then, in effect, responds to that question by discussing information systems, offering practical suggestions, and furnishing a list of information resources.*

Note: DCR *cannot continue its "Dilemmas in Country X" feature without contributions from readers. We urge subscribers willing to share development communication dilemmas from around the world to send their dilemmas to* DCR. *As always, anonymity will be preserved on request.*

The acquisition, processing and dissemination of information is an essential part of the development process.

Different kinds of information are required by many different kinds of users: government administrators, development bank officers, factory and plantation managers, training and extension workers, university staff, research scientists, development consultants and, last but not least, farmers themselves. They all need the right information, at the right time, so that the right decisions can be made.

The introduction or further expansion of information services in developing countries is beset by a number of problems, the most important of which are identified below.

Personnel

In most developing countries there is currently a great shortage of trained library and information scientists. Fortunately, international organizations, such as the Federation international de documentation and UNESCO, have realized this problem and have given it the priority it deserves in their programs.

A fundamental problem in many cases is one of attitudes. For example, the information scientist is frequently mistaken for an untrained library clerk by users; all too often this feeling extends to management and is reflected in low status and salaries—factors hardly likely to attract newcomers to the profession.

Communication

Even in the industrialized countries, information services in agriculture have to deal with numerous small research stations, training centers and so on, scattered throughout the country, often well away from centers of population and national library resources. In developing countries this problem is frequently exacerbated by poor telephone and postal services and inadequate road or rail links.

This isolation not only delays postal and other communications, but it is also difficult for young, newly trained information workers to develop their full potential as they are cut off from their peers in this way.

Organization

The uncoordinated, piecemeal development of government institutions and frequent reorganization in many developing countries have resulted in duplication of effort and dissipation of resources. The "coordination of all services involved in the provision of information" as laid down in the UNESCO National Information System (NATIS) guidelines proves extremely difficult when information dissemination is the task of so many different ministries and departments.

Resources

Despite recent improvements in library holdings in some places, most developing countries suffer from a lack of easy access to many important books and journals. When a journal is available it may well only be held in one or two libraries in the country.

Another problem is language. The dominant position of European language publications in tropical agriculture tends to create a language barrier for many users in developing countries where translation facilities are usually not easily available.

Finance

The severely limited financial means of most libraries and information centers in developing countries is self-evident. The problem is made worse by the exchange control regulations of many countries and the relatively high cost of journals, books, and information services from the industrialized countries.

Role of information services

It is against this background that we have to consider the role of the international information suppliers. In fact, the picture is generally not quite as bleak as it has been painted, since usually not all these problems are equally severe in all countries.

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Development Communication Report

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